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October 1990

*** 32K Spectrum Emulator Version D ***

INSTALLATION

UNPACKING

Your eprom is inserted in a black foam carrier; leave it there til you install it. NOTE: there are two diodes inserted on the reverse side of the foam; please don't loose them.

INSTALLATION

On Page 3 you'll find a full-scale drawing of the inside of the 2068, showing where the eprom, switch and diodes are to be installed. The eight installation steps are shown above the drawing. the INSTALLATION NOTES give more details about each step.

TOOLS REQUIRED:

- 1) A low-power (15 watt) grounded soldering iron.
- 2) A solder-sucker (optional).
- 3) Rosin-core solder.
- 4) A drill, preferable battery-operated with low-speed option.
- 5) 3/32" drill bit.
- 6) 1/4" drill bit.
- 7) Exacto knife, or sharp pocket knife.
- 8) Medium phillips and small flat-head screwdrivers.

10K PULLUP RESISTORS

The 32K eprom is fitted with the 7 data-line pull-up resistors which TIMEX forgot. They are in an 8-lead resistor network on top of the eprom. These resistors have no effect, other than making the computer compatible with some Spectrum machine-code programs which operate in Interrupt Mode 2 and expect the resistors to be there, as they are on the Spectrum.

If your computer or an external interface has already been fitted with pull-up resistors, you should clip the 7 data wires from the eprom's resistor network, or remove the others from your computer or interface.

OPERATION

Operation of the computer with the 32K eprom installed is described in a separate document. Also see OPERATION NOTE at bottom of Page 2.

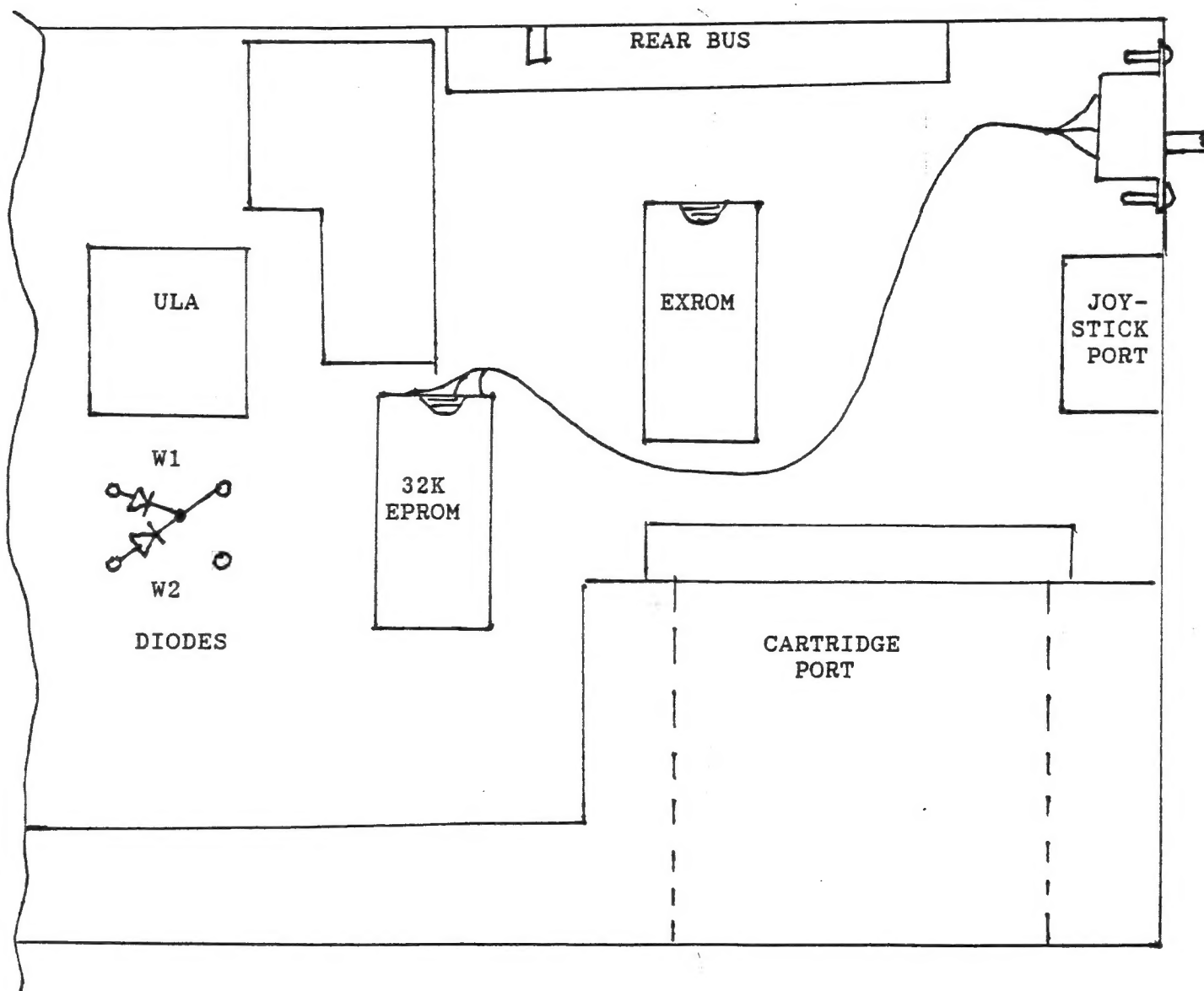
HELP

If you feel that the installation is beyond your capabilities, I can do it for you at a cost of \$15, which includes a "loaner 2068" which I will send you first, for you to use while you send me your own 2068. The \$15 includes shipping charges for my mailing you the loaner, and later returning your 2068. If you have a spare 2068 and don't need a loaner, the cost is \$10.

2068/SPECTRUM 32K EPROM INSTALLATION

(Also see INSTALLATION NOTES.)

1. Remove keyboard.
2. Remove ROM.
3. Remove gray jumpers W1 and W2.
4. Install diodes as shown, in place of jumpers.
5. Install 32K Eprom, with switch cable toward rear.
6. Install switch on right side, at right of joystick port.
7. Test with keyboard off and no interfaces attached.
8. Replace keyboard.



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*** 32K SPECTRUM EMULATOR Version D ***

OPERATION

This emulator consists of a 32K eprom, 2 diodes, and a rear-mounted SPDT slide switch. The switch is marked "S" and "T", meaning "Spectrum" and "Timex". The switch selects the upper or lower half of the 32K eprom, and should normally only be moved when the computer is off.

The 32K eprom contains ROM FIXES, to correct certain errors. These are described later. The lower half of the 32K eprom contains the 16K Timex Basic operating system. The upper half contains the Spectrum Basic operating system.

IMPORTANT NOTE: Version C of the eprom, which implemented an excellent 2068 DELETE-FIX, also unfortunately contained two BUGS associated with the delete-fix:

1. True Video and Inverse Video keys do not work.
2. Underline key produces hyphen rather than underline.

These bugs have been corrected in Version D, which is being sent free of charge to owners of Version C, as a replacement. When you have replaced Version C with Version D, please return Version C, since the eprom is re-useable.

ROM FIXES

1. CURSOR LEFT (by Dr. Ian Logan)

Without this fix, the cursor-left function doesn't work properly on the top screen line. The standard Timex ROM has this fix.

2. SCREEN\$ (by Dr. Ian Logan)

Without this fix, the SCREEN\$ function works improperly in some situations. The standard Timex ROM has this fix.

3. ROUND-UP (by Dr. Ian Logan)

Without this fix, PRINT 1/2-.5 results in 2.3283064E-10, an error. WITH this fix, PRINT 1/2-.5 results in 0, which is correct. The standard Timex ROM has this fix.

4. INT-65536 (by Bob Orrfelt, as suggested by Dr. Ian Logan)

Without this fix, PRINT INT -65536 results in -1, an error. WITH this fix, PRINT INT -65536 results in -65536, correctly. Both standard ROMS contain this error.

4. INT-65536 changes: (Spectrum and 2068)

---SPECTRUM---			---TIMEX---			-----MNEMONICS-----			
LOC	IS	WAS	LOC	IS	WAS	LBL	IS	WAS	
3032	F5	77	33F1	F5	77		PUSH AF	LD	(HL),A
3033	3C	23	33F2	3C	23		INC A	INC	HL
3034	B3	73	33F3	B3	73		OR E	LD	(HL),E
3035	B2	23	33F4	B2	23		OR D	INC	HL
3036	C2	72	33F5	C2	72		JP NZ,X1	LD	(HL),D
3037	25	2B	33F6	E4	2B		---	DEC	HL
3038	32	2B	33F7	35	2B		---	DEC	HL
3039	C3	2B	33F8	C3	2B		JP X3	DEC	HL
303A	30	D1	33F9	EF	D1		---	POP	DE
303B	32	C9	33FA	35	C0		---	RET	
3223	18	20	35E2	18	20		JR T-SML	JR	NZ,T-SML
3224	1A	1A	35E3	1A	1A		---	---	
3225	F1	23	35E4	F1	23	X1	POP AF	INC	HL
3226	77	23	35E5	77	23		LD (HL),A	INC	HL
3227	23	23	35E6	23	23	X2	INC HL	INC	HL
3228	73	3E	35E7	73	3E		LD (HL),E	LD	A,80H
3229	23	80	35E8	23	80		INC HL	---	
322A	72	A6	35E9	72	A6		LD (HL),D	AND	(HL)
322B	2B	2B	35EA	2B	2B		DEC HL	DEC	HL
322C	2B	B6	35EB	2B	B6		DEC HL	OR	(HL)
322D	2B	2B	35EC	2B	2B		DEC HL	DEC	HL
322E	D1	20	35ED	D1	20		POP DE	JR	NZ,T-FR
322F	C9	03	35EE	C9	03		RET	---	
3230	F1	3E	35EF	F1	3E	X3	POP AF	LD	A,80H
3231	2B	80	35F0	2B	80		DEC HL	---	
3232	36	AE	35F1	36	AE		LD (HL),	XOR	(HL)
3233	91	2B	35F2	91	2B		---	91H	DEC HL
3234	23	20	35F3	23	20		INC HL	JR	NZ,T-EX
3235	36	36	35F4	36	36		LD (HL),	---	
3236	80	77	35F5	80	77		---	80H	LD (HL),A
3237	3C	23	35F6	3C	23		INC A	INC	HL
3238	18	36	35F7	18	36		JR X2	LD	(HL),FFH
3239	ED	FF	35F8	ED	FF		---	---	

-----TIMEX-----			-----MNEMONICS-----			
LOC	IS	WAS	LBL	--IS----	-----WAS-----	
0503	FE	FE		CP 31		CP 32
0504	1F	20		--		--
0505	CA	D2		JP Z,#05F0		JP NC,#05F0
0506	F0	F0		--		--
0507	05	05		--		--
0508	FE	FE		CP 32		CP 12
0509	20	0C		--		--
050A	D2	20		JP NC,#05F0		JR NZ,#0513
050B	F0	07		--		--
050C	05	FD		--		BIT 4,(FLAGS)
050D	18	CB		JR #0513		--
050E	04	01		--		--
050F	00	66		NOP		--
0510	00	CA		NOP		JP Z,#05F0
0511	00	F0		NOP		--
0512	00	05		NOP		--
0513	FE	FE		CP 6		CP 6
0514	06	06		--		--

063B	FE	FE		CP 31		CP 12
063C	1F	0C		--		--

0AA2	FE	FE		CP 31		CP 12
0AA3	1F	0C		--		--
0AA4	28	20		JR Z,#0AE7		JR NZ,#0AB2
0AA5	41	0C		--		--
0AA6	18	FD		JR #0AB2		BIT 5,(FLAGS2)
0AA7	0A	CB		--		--
0AA8	00	30		NOP		--
0AA9	00	06		NOP		--
0AAA	00	20		NOP		JR NZ,#0AB2
0AAB	00	06		NOP		--
0AAC	00	FD		NOP		BIT 3,(FLAGS2)
0AAD	00	CB		NOP		--
0AAE	00	01		NOP		--
0AAF	00	5E		NOP		--
0AB0	00	28		NOP		JR Z,#0AE7
0AB1	00	35		NOP		--
0AB2	FE	FE		CP 24		CP 24
0AB3	18	18		--		--
